

OFFICIAL COORDINATION REQUEST FOR NON-ROUTINE OPERATIONS AND MAINTENANCE

COORDINATION TITLE- 15TDA08 transformer delivery/installation

COORDINATION DATE- 25 June 2015

PROJECT- The Dalles Dam

RESPONSE DATE- 13 August 2015 (FPOM)

Description of the problem - The Dalles facility has undergone several major projects which including the replacement of a number of the 2 banks main GSU transformers (T-2 and T-4). Due to their age, condition, and likelihood of failure associated with their age, the older single phase GSU and fish unit transformers should be replaced. Priority of replacement will consider potential impacts to fish passage and likelihood of failure. The following failure related issues will be considered; the most likely to fail first, those with the most noted issues or concerns as shown by maintenance or operational documentation, and those where a failure would lead to the largest loss of power generation and transmission. The purpose of this project is to replace the single phase 1954-1958 water cooled Ferranti GSU transformers and 1956 Central Transformer Corporation fish unit transformers with new air cooled GSU transformers over a period of several years.

Specifically called out for replacement are: TA (to be removed only), T1, T3, T5, T6, T7, T8.

Type of outage required – Each transformer serves two main units and are out of service during installation of each transformer (Table 1). Fish Units (FUs) will run on T1 while T3 is replaced and will run on the newly replaced T3 while T1 is replaced. Fish Units will run on T1 or T3 after TA is taken offline January 2018.

Table 1. Transformer replacement and TA removal schedule. The generating units associated with each transformer is also listed.

| Transformer | Generating Units | Anticipated Schedule |
|--------------------|-------------------------|-----------------------------|
| TA | Fish Units | After Jan 2018 |
| T1 | 1, 2 | 1 Nov – 28 Feb 2020 |
| T3 | 5, 6 | 1 Nov – 28 Feb 2019 |
| T5 | 9, 10 | 1 Mar – 30 Jun 2019 |
| T6 | 11, 12 | 1 Jul – 31 Oct 2019 |
| T7 | 13, 14 | 1 Jul – 31 Oct 2018 |
| T8 | 15, 16 | 1 Mar – 30 Jun 2018 |

Impact on facility operation – Each outage is estimated to be 4 months long, during which time associated units will not be operating, except for the fish units, which can use either T1 or T3.

TA will no longer be available after replacement of fish unit breakers scheduled for January 2018. However fish units will use transformer T3 instead of TA. Transformer T1 will also remain available. Unit outages are scheduled to minimize the risk to adult fish passage in case of a T1 or T3 failure while either transformer is being replaced, which would result in the FU's being out of service.

Units 1 and 2 will be out of service from November – February 2020. Units 3 and 4 will be operated instead to meet unit priorities (Table TDA-5).

Table TDA-5. Turbine Unit Operating Priorities at The Dalles Dam.

| PERIOD | PRIORITY |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Fish Passage Season: April 1–November 30 If additional units needed, operate one unit from each block moving west to east. Repeat as necessary. | 1, 8, 18* block 2-4, block 5-7, block 9-12, block 13-16, block 17-22 |
| December 1 – December 15 | 1 and/or 2, 18 [†] |
| December 16 – end of February | 1-22 in any order |
| March 1 – March 31 | 1 and/or 2, 3 and/or 4, 8, 18 [†] |

*During fish passage season: Units under open sluice gates 1,8,18 (Table TDA-4).

[†] During March and December operation for adult steelhead fallbacks and kelt passage: Units 1 and 18 must be operated with 2 open sluice gates per unit (Table TDA-4).

Dates of impacts/repairs – March 2018 through February 2020

Length of time for repairs – Each transformer will take about four months (see Figure 1 and Table 1).

Expected impacts on fish passage –

Upstream migrants (including bull trout and Pacific lamprey) – Fish Units can operate through T1 or T3 and the replacement of those transformers will not impact Fish Unit operation. However there will be no redundancy for Fish Units during transformer replacement. Therefore we propose replacing T3 during NOV through FEB 2019 when adult passage is low (Figure 2). T1 will be OOS from NOV through FEB 2020 and will result in a deviation from the Fish Passage Plan unit priorities (Table TDA-5). No impacts to adult migrants are anticipated.

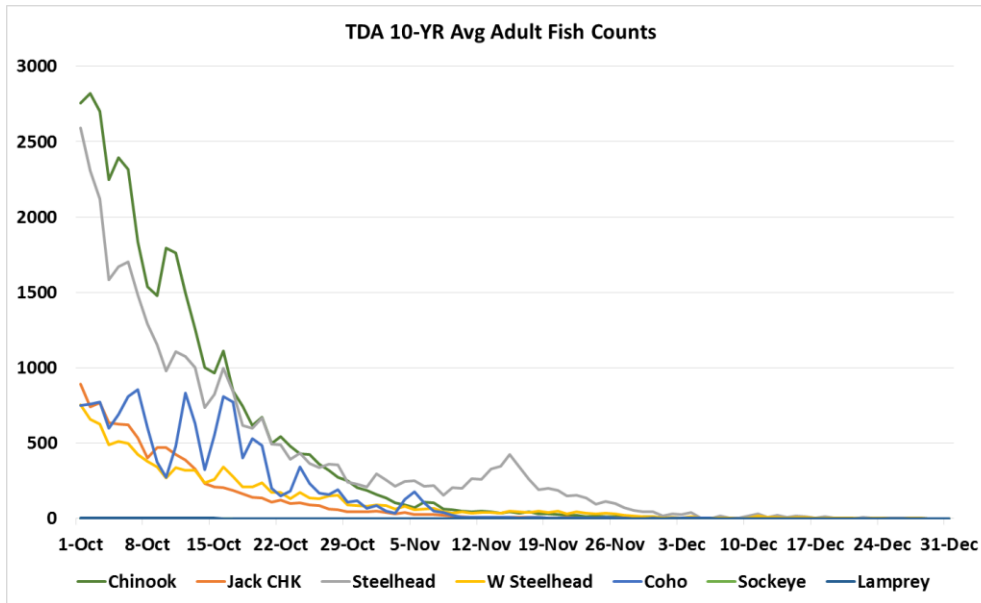


Figure 1. 10 year average adult fish passage at The Dalles Dam. Data from Columbia River DART, Columbia Basin Research, University of Washington. (2016). Adult Passage Graphics & Text. Generated on 05 Dec 2016 12:24:42 PST. www.cbr.washington.edu/dart.

Downstream migrants (kelts, juvenile salmonids and lamprey) – ITS chain gates will be adjusted as needed as unit priority is adjusted to accommodate unit outages. Open gates will be moved from unit 1 to 3 during the T1 outage. Minimum impacts to downstream migrants are expected under the proposed conditions.

Comments from agencies

NOAA and TDA (Fredricks and Cordie)

-----Original Message-----

From: Gary Fredricks - NOAA Federal [<mailto:gary.fredricks@noaa.gov>]

Sent: Thursday, June 25, 2015 7:52 AM

To: Mackey, Tammy M NWP

Cc: Lorz, Tom; Trevor Conder - NOAA Federal; Cordie, Robert P NWP

Subject: [EXTERNAL] Re: FPOM: Official Coordination - 15TDA08 transformer installation (UNCLASSIFIED)

Tammy, Overall this shouldn't be a fish passage issue although there probably is some risk associated with no backup transformer for the fish units during the highest adult passage months of the year. This concern is compounded somewhat by the fact that all of these transformers are in need of replacement. We should have the emergency AWS system in place by 2017 but as you know, this system is not a full flow replacement for the fish units. Depending on the opinions of the condition of TA and T1, perhaps T7 should be switched in place of T1 to assure redundancy through October.

Also, I noted that the fish unit transformer TA would be removed. Does this mean that there would be no redundancy here if T1 died in the future? Maybe some further discussion is

appropriate. Thanks, Gary

On Mon, Jun 29, 2015 at 9:22 AM, Cordie, Robert P NWP <Robert.P.Cordie@usace.army.mil> wrote:

Classification: UNCLASSIFIED
Caveats: NONE

There will still be redundancy with a bus tie to another transformer bank. It will be through a different line for improved redundancy in case line 1 fails.

More explanation at FPOM.

-----Original Message-----

From: Gary Fredricks - NOAA Federal [<mailto:gary.fredricks@noaa.gov>]

Sent: Tuesday, June 30, 2015 1:07 PM

To: Cordie, Robert P NWP

Subject: Re: [EXTERNAL] Re: FPOM: Official Coordination - 15TDA08 transformer installation (UNCLASSIFIED)

Bob, Is this bus tie a future benefit (after all the transformer work) or something you can do now? In other words, does it affect my concern for the lack of a backup while the work is being done on TA ? Thanks, Gary

-----Original Message-----

From: Cordie, Robert P NWP

Sent: Tuesday, June 30, 2015 1:27 PM

To: Gary Fredricks - NOAA Federal

Cc: Mackey, Tammy M NWP

Subject: RE: [EXTERNAL] Re: FPOM: Official Coordination - 15TDA08 transformer installation (UNCLASSIFIED)

Classification: UNCLASSIFIED

Caveats: NONE

Gary,

Yes it will be a future benefit and no it's not something we can do before the AWS work starts, because it's a pretty big project.

There are actually 2 projects planned. 1) Fish unit breaker upgrade/replacement (at 10% Plans). 2) powerhouse transformer replacement.

While discussing the best alternatives for the fish unit breaker upgrades, eliminating TA transformers was brought up.

The latest schedule for transformer installs is summer of 2017. Should put us just after the install of AWS backup. This is preliminary and we'll still need to work through unit outages needed for the transformer install.

Future benefit; we do have a bus tie now from TA (fish units) to T1 (main units 1 and 2). Both TA and T1 use line 1, so there is no redundancy for a line failure. New plans will tie to another line, preferable 230KV on the east end for more flexibility.

Lots more to come...

09 July 2015 FPOM meeting. 15TDA08 transformer installation. *Pending.* FPOM asked if it would be possible to switch T1 and T7 to reduce the chance of losing the fish units (able to run on TA or T1) during fish passage season. T1 is water cooled and has the most issues right now. The PDT has greatest concern about T1 and is reluctant to delay starting this one. FPOM asked if there is a way to provide redundancy for TA while T1 is out of service, in the event that TA fails before T1 returns. Bettin asked about using the back-up AWS if TA were to fail while T1 is OOS.

13 August 2015 FPOM meeting. 15TDA08 transformer installation. *Approved.* T1 and T3 were switched so there would be redundancy for Fish Units. Lorz had suggested switching T1 with T7 but that would result in no redundancy for the Fish Units. Cordie would like the Bus tie is tested before it is turned over to the Project.

Final results – This work will proceed as coordinated.

Please email or call with questions or concerns.

Thank you,

Ricardo Walker
PM-E Fisheries

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Tammy Mackey

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